A revision of *Eucalyptus normantonensis* Maiden & Cambage (Myrtaceae) and its allies

A.R. Bean

Summary

Bean, A.R. (2000). A revision of the *Eucalyptus normantonensis* Maiden & Cambage (Myrtaceae) and its allies. *Austrobaileya* 5(4): 679–685. Descriptions, distribution maps and an identification key are provided for the four species comprising the *E. normantonensis* group, including one new species (*E. provecta*) and one new combination (*E. tardecidens*). All species occur in northern Queensland, with one extending to the Northern Territory.

Keywords: *Eucalyptus, Eucalyptus normantonensis, Eucalyptus provecta*, Myrtaceae, Queensland, taxonomy, new species, key

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Introduction

The box-group of eucalypts, i.e. species with scaly, short-fibred, persistent bark, reniform cotyledons, petiolate juvenile leaves, adnate anthers and terminal, paniculate inflorescences was distinguished by Blakely (1934) as *Eucalyptus* ser. *Buxeales* Blakely. This natural grouping is still recognised today. Within the box-group, members of the *E. normantonensis* group share the following characteristics: rough grey bark at least on lower stems; adult leaves narrow-lanceolate, concolorous, green to grey-green; juvenile leaves ovate to lanceolate, grey-green; fruits 3–5.5 mm long, hemispherical, ovoid or cylindrical, valves included.

E. normantonensis was named by Maiden and Cambage in 1919, and was initially known only from Normanton in north-western Queensland. Subsequently, the name was applied to a wide range of trees and mallees extending from near the east coast of Queensland to the extreme east of Western Australia (Hall & Brooker 1974). Johnson & Hill (1991) recognised the distinctiveness of some of these populations by naming *E. persistens* with two subspecies, from eastern Queensland.

The closest affinity of *E. normantonensis*, and hence of the group as a whole, has never been clear. Maiden originally considered it to be a form of *E. gracilis* F.Muell., a species from southern Australia, which differs fundamentally because of its bisected cotyledons and smaller subversatile anthers. Blakely (1934) placed *E. normantonensis* close to *E. microtheca* F.Muell. and *E. rummeryi* Maiden. Pryor and Johnson (1971) placed it next to *E. largeana* Blakely and *E. lucasii* Blakely. Chippendale (1988) placed it next to *E. tectifica* F.Muell. and *E. chlorophylla* Brooker & Done. A phylogenetic analysis of the 'box'-group will be necessary to determine more precisely, the relationships between the constituent taxa.

Herbarium material of the *E. normantonensis* group is very similar to *E. largiflorens* F.Muell., however *E. largiflorens* is readily distinguished in the field by the linear juvenile leaves, completely rough almost-black bark and alluvial soil habitat. Furthermore, the distribution of *E. largiflorens* does not overlap with any member of the *E.normantonensis* group.

Of the species occurring in the same geographic area, herbarium material of *E. microtheca* and *E. chlorophylla* has been misidentified as *E. normantonensis*, and vice-versa. *E. microtheca* differs by its smaller and thinner-walled fruits, while *E. chlorophylla* differs by the larger obconical fruits and very glossy leaves.

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The individual members of the *E. normantonensis* group (*E. normantonensis, E. persistens, E. tardecidens* and *E. provecta*) often cannot be distinguished in the herbarium if material is incomplete. Nevertheless the differences between the taxa are significant and not merely quantitative (as outlined in the key). All taxa are allopatric, allowing placement of incomplete specimens with accompanying locality data.

Taxonomy

Eucalyptus normantonensis Maiden & Cambage, J. & Proc. Roy. Soc. New South Wales 52: 489 (1919). **Type:** Queensland. BURKE DISTRICT: Normanton, [17° 4–‘ S 141° 0–‘ E], August 1913, *R.H. Cambage* 3930 (holo: NSW; iso: BRI).

E. bicolor var. *xanthophylla* Blakely, Key Eucalypts 232 (1934); *E. largiflorens* var. *xanthophylla* (Blakely) Cameron, Victoria Naturalist 63: 42 (1946). **Types**: Camooweal, Qld, 26 June 1922, *S.A. White s.n.* (syn: ?, n.v.); Barrow Creek, N.T., 3 May 1922, *S.A. White* 244 (syn: NSW; isosyn: AD).

Mallee 2–8 metres high, lignotuberous. Bark box-type on lower stems, mottled light and dark grey, closely adhering; smooth, grey to bronze-coloured above. Juvenile leaves alternate, petiolate, broadly lanceolate to ovate, up to 8×3 cm, dull (internally glaucous). Adult leaves narrowly lanceolate, 8-11.5×0.6-1.4 cm, alternate, leathery, concolorous, dull-yellow to shiny-green; penninerved, lateral veins at 35-50° to the midrib; reticulation dense, incomplete, oil glands intersectional; petioles 0.6-1.0 cm long. Inflorescences pseudo-terminal, paniculate, umbellasters 7-flowered; peduncles thick, more or less terete, 4.5-8 mm long at anthesis. Mature buds obovoid to ellipsoidal, 3.0-4.0 mm long, 2-2.5 mm in diameter, pedicels 1.5-4 mm long. Hypanthium unribbed; operculum scar present; outer operculum shed long before anthesis; inner operculum hemispherical, with or without umbo, smooth, thin; stamens white, in about 4 whorls; inner whorls inflexed, fertile, 0.8-2.0 mm long; outer whorls irregularly flexed, 2.0-3.0 mm long, without anthers. Anthers ovoid, adnate, basifixed, opening by pores. Style terete, 1.6-2.0 mm long, stigma blunt. Ovary 3-4-locular, ovules in 4 longitudinal rows. Fruits hemispherical, hemispherical or shortly cylindrical, 3.0-4.0(-4.5) mm long, 3.0-4.0 mm in diameter, thick-walled, disc annular, descending, valves obtuse, enclosed. Seeds ellipsoidal, finely and evenly reticulate, 0.9-1.2 mm long, not toothed, dark brown; chaff irregular in shape, smaller than seeds, pale brown.

Selected specimens: **Queensland.** BURKE DISTRICT: Normanton, Aug 1936, *Blake* 12477 (BRI); 27.9 km S of Croydon turnoff on Cloncurry road, S of Normanton, Mar 1990, *Brooker* 10425 (BRI, CANB, DNA, NSW); 14.9 km from Mt Isa on Camooweal road, Mar 1990, *Brooker* 10433 (BRI, CANB, MEL); 40 km W of Mt Isa on Barkly Highway, Aug 1984, *Hill* 1041 *et al.* (BRI, CANB, NSW); 20 miles [32 km] SW of Normanton, Aug 1953, *Perry* 3944 (BRI, CANB); 64 miles [102 km] SE of Burketown, Jul 1954, *Speck* 4774 (BRI) GREGORY NORTH DISTRICT: 7.7 km W of Dajarra, on road to Mt Isa, Jul 1988, *Bean* 890 (BRI); 122 km W of Winton, W of Cadell Creek, Mar 1990, *Brooker* 10435 (BRI, DNA, MEL, NSW); Bladensburg N.P., S of Winton, Opalton road, Mar 1998, *Forster* PIF22187 & *Booth* (AD, BRI, CANB, DNA, MEL, NSW); on Standish Ranges, 1 km W of Ibis Bore, 13 km SW of The Monument, Oct 1984, *Neldner* 1524 (BRI); 28 km NNW of ‘Pathungra’, Sep 1977, *Purdie* 1032 (BRI). MITCHELL DISTRICT: 32 km S of Stonehenge on road to Jundah, Aug 1978, *Dick* WQ187 (BRI). Northern Territory. 20 km SW of Barrow Ck, May 1994, *Albrecht* 5864 (BRI, CANB, DNA, NSW, NT); NW of Mt Strezleckii, May 1952, *Bateman* 327 (BRI); 16 miles [26 km] E of Coniston HS., Feb 1955, *Chippendale* 1236 (BRI); near Redbank Gorge, Macdonnell Ranges, Sep 1958, *Chippendale* 4884 (BRI, DNA); Ormiston Gorge, north ridge, Jun 1972, *Dunlop* 2627 (BRI, DNA); Central Mt Stuart, Jun 1969, *Maconochie* 714 (BRI, DNA); 7 miles [11 km] N of Tennant Creek, Apr 1948, *Perry* 570 (BRI).

Distribution and habitat: *E. normantonensis* is distributed in parts of western Queensland as far south as Jundah, and in central parts of the Northern Territory (Map 1). It grows on ridges (sometimes lateritised) with shallow gravelly soil.

Phenology: Flowers are recorded mainly from March to August.

Notes: *E. normantonensis* has the ability to produce flowers and fruits while the leaves are still in an intermediate stage of ontogeny. This accounts for the small proportion of disparately broad-leaved specimens in herbaria.

Buds and fruits of some Northern Territory material are larger than the Queensland material, but the difference is not considered to be sufficient to warrant any taxonomic recognition. Similarly for difference in leaf colour; in plants from the type area they are green and rather glossy, while from inland areas they are glaucous or yellowish and not as glossy.

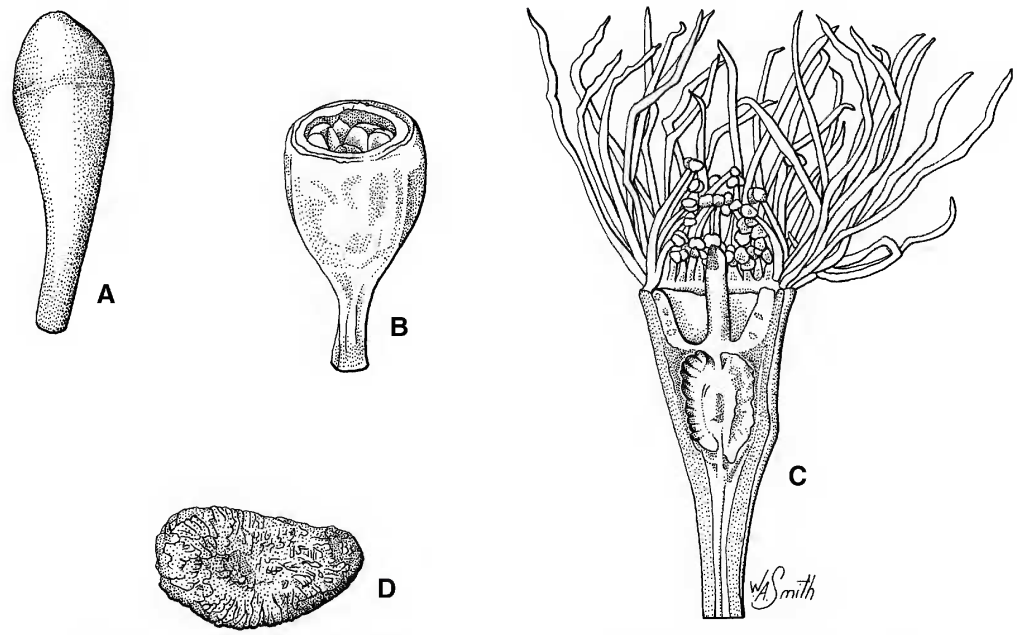


Fig. 1. ***Eucalyptus provecta.*** A. mature bud, with operculum scar × 5. B. fruit, showing enclosed valves × 5. C. longitudinal section of flower, showing inner fertile stamens and outer staminodes ×7. D. seed × 20. All from *Bean* 12245.

Conservation status: Not considered to be rare or threatened.

Eucalyptus provecta A.R.Bean **sp. nov.** affinis *E. normantonensi* a qua habitu arboris, cortice ubique persistenti, petiolis longioribus, filamentis staminalibus in verticillo extimo 4.5–5.5 mm longis differt. **Typus**: Queensland. Cook District: 4.8 km south of 'Wirra Wirra', via Forsayth, 18° 38'S 143° 43'E, 7August 1997, *A.R.Bean* 12245 (holo: BRI; iso: CANB, MEL, NSW, QRS).

Tree to 12 metres high, rarely a mallee, lignotuberous. Bark box-type, persistent throughout, grey, mottled light and dark grey, closely adhering. Juvenile leaves alternate, petiolate, lanceolate to broadly lanceolate, up to 12×3.5 cm, dull (internally glaucous). Adult leaves lanceolate to narrowly lanceolate, 8–13×0.8–1.7 cm, alternate, leathery, concolorous, dull; penninerved, lateral veins at 35–50° to the midrib; reticulation dense, incomplete, oil glands intersectional; petioles 1.0–1.7 cm long. Inflorescences pseudo-terminal, paniculate, umbellasters 7-flowered; peduncles thick, more or less terete or somewhat flattened, 4–8 mm long at anthesis. Mature buds ovoid to obpyriform, 3.5–5.0 mm long, 2.0–3.0 mm in diameter, pedicels 3–6 mm long. Hypanthium unribbed; operculum scar present; outer operculum shed long before anthesis; inner operculum hemispherical, with or without umbo, smooth, thin; stamens white, inner whorls inflexed, fertile, 1.5–2 mm long, outer whorls irregularly flexed, 4.5–5.5 mm long, without anthers. Anthers ovoid, adnate, basifixed, opening by pores. Style terete, 1.7–2 mm long, stigma tapered. Ovary 3–4-locular, ovules in 4 longitudinal rows. Fruits ovoid-

truncate to obconical, 3.5–5.5 mm long, 3.5–5.0 mm in diameter, thick-walled, disc annular, valves obtuse, enclosed. Seeds ellipsoidal, finely reticulate, 0.9–1.5 mm long, not toothed, dark brown; chaff irregular in shape, smaller than seeds, pale brown. Fig. 1.

Specimens examined: **Queensland**. BURKE DISTRICT: Chudleigh Park station, upper reaches of Stawell River, May 1995, *Forster* PIF16503 & *Figg* (BRI, CANB, NSW). COOK DISTRICT: 21.8 km from Forsayth towards Einasleigh, Jun 1987, *Bean* 606 (BRI); Bulleringa N.P., 80 km NW of Mount Surprise, Oct 1992, *Bean 5119* (BRI, CANB, MEL); 0.5 km E of 'Wirra Wirra' HS., east of Forsayth, Aug 1997, *Bean* 12249 (BRI); just S of Beverley Hills HS, SW of Einasleigh, Aug 1998, *Bean* 13765 & *Fox* (BRI, CANB); crest of Newcastle Range, Jul 1954, *Blake* 19525 (BRI); Gulf Development road, c. 15 km W of Mt Surprise, Aug 1979, *Clarkson* 2534 & *Byrnes* (BRI); Mopata H 'Beverley Hills', edge of Red plateau, W of head of Robertson River, Sep 1994, *Godwin* EU589C (BRI, CANB, DNA, NSW); c. 20 km S of Robin Hood station on track to Percy Vale, Aug 1982, *Hill* 1062 & *Johnson* (BRI, CANB, NSW); NW of Werrington Stn, NW of Hughenden, Oct 1978, *Martensz* 1246 (BRI, CANB); 12 miles [19 km] E of Forsayth township, Jul 1953, *Perry* 3848 (BRI); 39 miles [62 km] S of Forsayth township, Jul 1953, *Perry* 3852 (BRI).

Distribution and habitat: *E. provecta* extends from Bulleringa National Park (north of Mt Surprise) to Chudleigh Park station north of Hughenden (Map 1).

Phenology: Flowers are recorded from May to August.

Affinities: *E. provecta* is most closely related to *E. normantonensis*, but differs by the tree habit, bark persistent throughout, petioles 1.0–1.7 cm long (0.6–1 cm for *normantonensis*), filaments in outer whorl 4.5–5.5 mm long (2–3 mm for *normantonensis*) and the mostly larger fruits. *E. provecta* differs from *E. tardecidens* by the flowers with staminodes, the often shorter buds, and slightly longer style. *E. provecta* differs from *E. persistens* by the flowers with staminodes, the style 1.7–2 mm long (2.5–3 mm long for *persistens*) and the larger fruits.

Conservation status: Not considered to be rare or threatened.

Etymology: From the Latin *provecta* - advanced, carried forward, extended; in reference to the rough bark extending throughout, in contrast to *E. normantonensis*.

Eucalyptus persistens L.A.S.Johnson & K.D.Hill, Telopea 4(2): 336 (1991); *Eucalyptus persistens* L.A.S.Johnson & K.D.Hill subsp. *persistens*, Telopea 4(2): 336 (1991). **Type**: Queensland. SOUTH KENNEDY DISTRICT: 4.8 km NE of Shuttleworth bore, 'Lou Lou Park' Station, 22° 15'S 146° 09'E, 21 August 1984, *K.D. Hill* 1182 & *L.A.S. Johnson* (holo: NSW; iso: BRI, CANB, MEL).

Tree to 12 metres high, or sometimes a mallee, lignotuberous. Bark box-type, mottled light and dark grey, closely adhering; persistent throughout. Juvenile leaves alternate, petiolate, ovate, up to 10×4 cm, dull. Adult leaves narrowly lanceolate, 7.5–13×0.9–2 cm, alternate, leathery, concolorous, somewhat shiny; penninerved, lateral veins at 35–50° to the midrib; reticulation dense, incomplete, oil glands intersectional; petioles 0.8–1.7 cm long. Inflorescences pseudo-terminal, paniculate, umbellasters 7-flowered; peduncles thick, more or less terete, 4–8 mm long at anthesis. Mature buds ovoid to obovoid, 4–6 mm long, 2–3 mm in diameter, pedicels (2–)4–6 mm long. Hypanthium unribbed; operculum scar absent; inner operculum conical, smooth, thin; stamens white, inner whorls inflexed, fertile, 1–2 mm long; outer whorls irregularly flexed, 4–5 mm long, fertile. Anthers ovoid, adnate, basifixed, opening by pores. Style terete, 2.5–3 mm long at anthesis, stigma blunt to tapered. Ovary 3–4-locular, ovules in 4 longitudinal rows. Fruits ovoid-truncate to cylindrical, 3–4.5 mm long, 3–3.5 mm in diameter, thick-walled, unribbed; disc annular; valves obtuse, enclosed. Seeds ellipsoidal, finely reticulate, 1.2–1.5 mm long, not toothed, dark brown; chaff irregular in shape, smaller than seeds, pale brown.

Selected specimens: **Queensland.** BURKE DISTRICT: W of "Warang", White Mountains N.P., Jun 1992, *Bean* 4624 (BRI, MEL). NORTH KENNEDY DISTRICT: "Upsan Downs", 2.5 km S of Greenvale, Apr 1990, *Batianoff* 900428 (BRI, CANB, NSW); near Bogie River at "Etonvale", WSW of Bowen, Mar 1992, *Bean* 4245 (BRI, NSW); Flinders Highway, 18.4 km W of Charters Towers, Aug 1997, *Bean* 12291 (BRI, CANB); Valley

of Lagoons, 57 km SW of Mt Garnet, May 1989, *Brooker* 10186 (BRI, CANB, DNA, MEL, NSW); between Wairuna and Minnamoolka, Sep 1996, *Cumming* 15124 (BRI); 2 miles S of Middle Ck, Mt Garnet, Jun 1971, *Hyland* 5073 (BRI, QRS); Charters Towers–Clermont road, 45 miles [72 km] from Charters Towers, May 1960, *Johnson* 1855 (BRI); 1 mile [1.6 km] S of Niall Station, Jul 1954, *Lazarides* 4632 (BRI, CANB); 6 miles ESE of Conjuboy Station, Jul 1953, *Perry* 3745 (BRI). SOUTH KENNEDY DISTRICT: 19 miles [30 km] WNW of "Scartwater" station, May 1964, *Adams* 977 (BRI, CANB); 1.5 miles [2.4 km] W of Carmichael Station, Jul 1964, *Adams* 1175 (BRI, CANB); "Cairo", c. 35 miles [56 km] N of Clermont, Feb 1962, *Besset* E322 (BRI); NNW of Clermont, between Miclere and Brown Creeks, Apr 1945, *Blake* 15688 & *Webb* (BRI); Mt Coolon–Collinsville road, 0.7 km SW of Caves Ck, Jan 1996, *Champion* 1302 & *Pollock* (BRI, CANB, NSW); near the homestead on Moonoomoo Station, Oct 1983, *Henderson* H2788 et al. (BRI); 12.4 km W of Eungella Dam, Aug 1976, *Kleinig* DK297 (BRI, CANB); 3 miles [5 km] S of Cape River on Charters Towers–Clermont road, Jun 1966, *Pedley* 2128 (BRI); MITCHELL DISTRICT: 137 km S of Torrens Creek on road to Aramac, May 1994, *Brooker* 11918 (BRI, CANB); Berricania, Apr 1919, *White* s.n. (BRI); S of Mannya N.P., Aug 1994, *Fensham* 1796 (BRI).

Distribution and habitat: *E. persistens* extends from the White Mountains area to just north of Clermont, and east to Woodstock and Collinsville (Map 2). It often grows on the slopes of lateritic ridges, on pale infertile soils. It may also grow in deep sands or loams in undulating terrain.

Phenology: Flowers are recorded mainly from May to October.

Affinities: It differs from the rest of the group by the persistent outer operculum.

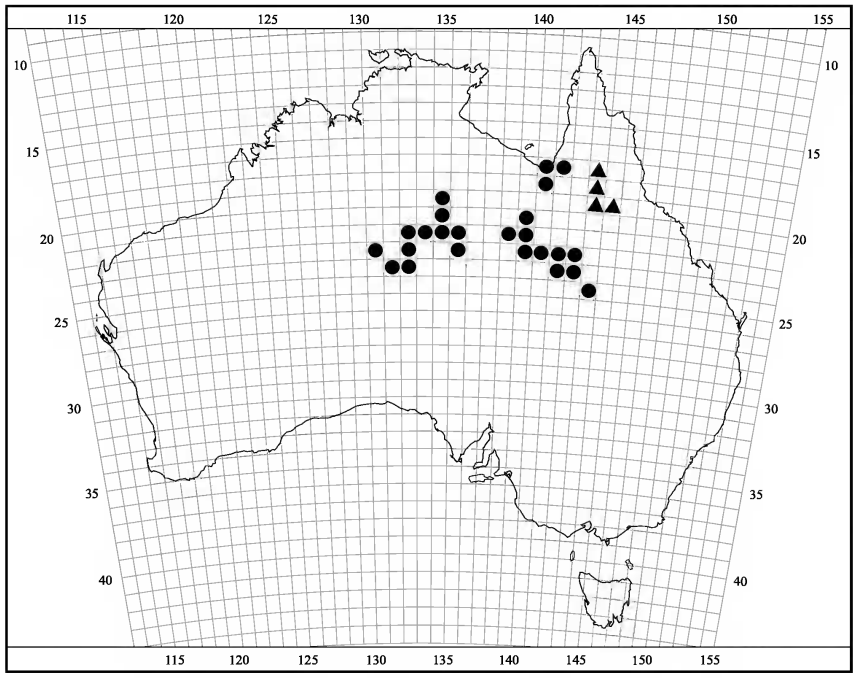
Conservation status: Not considered to be rare or threatened.

Eucalyptus tardecidens (L.A.S.Johnson & K.D.Hill) A.R.Bean **comb**. et **stat. nov.** *Eucalyptus persistens* subsp. *tardecidens* L.A.S.Johnson & K.D.Hill, Telopea 4(2): 337 (1991). **Type**: Queensland. COOK DISTRICT: 5.0 km S of Mt Carbine on Mareeba road, 16°33'S 145° 09'E, 12 August 1984, *K.D. Hill* 1066, *L.A.S.Johnson & D.F. Blaxell* (holo: NSW; iso: BRI, CANB, MEL).

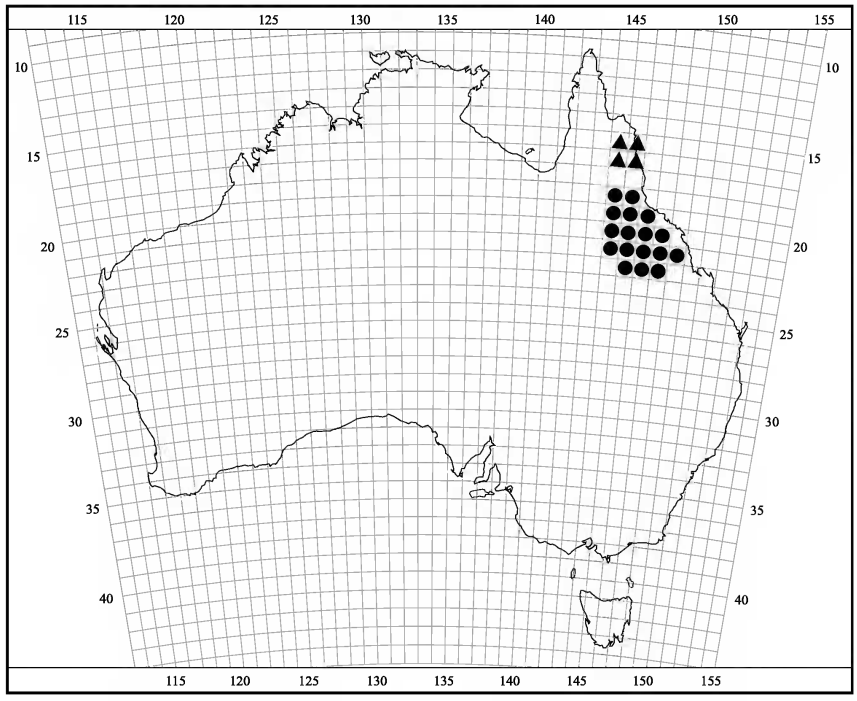
Mallee or tree to 7 metres high, lignotuberous. Bark box-type, mottled light and dark grey, closely adhering, persistent throughout. Juvenile leaves alternate, petiolate, broadly lanceolate, c. 8.5×3.0 cm, dull. Adult leaves lanceolate or narrowly lanceolate, 7.5–15×0.8–2.1 cm, alternate, leathery, concolorous, green, dull to shiny; penninerved, lateral veins at 35–50° to the midrib; reticulation dense, incomplete, oil glands intersectional; petioles 1.0–1.5 cm long. Inflorescences pseudo-terminal, paniculate, umbellasters 7-flowered; peduncles thick, more or less terete or somewhat flattened, 4–9 mm long at anthesis. Mature buds obovoid to obpyriform, 4.5–6 mm long, 2.5–3 mm in diameter, pedicels 3.5–6 mm long. Hypanthium ribbed; operculum scar present; outer operculum shed long before anthesis; inner operculum conical to almost hemispherical, smooth, thin; stamens white, inner whorls inflexed, 1–2 mm long, fertile; outer whorls irregularly flexed, 4.5–5 mm long, fertile. Anthers ovoid, adnate, basifixed, opening by pores. Style terete, 2–2.5 mm long at anthesis, stigma blunt. Ovary 3–4-locular, ovules in 4 longitudinal rows. Fruits ovoid-truncate to cylindrical, 4.5–5.5 mm long, 4–4.5 mm in diameter, thick-walled, faintly longitudinally ribbed; disc annular; valves obtuse, enclosed. Seeds ellipsoidal, finely reticulate, 0.9–1.2 mm long, not toothed, dark brown; chaff irregular in shape, smaller than seeds, pale brown.

Selected specimens: **Queensland.** COOK DISTRICT: 9.4 miles [15 km] by road N of Palmer River towards Cooktown, Aug 1973, *Brooker* 4023 (BRI, CANB); 25.3 km from Mt Molloy towards Mt Carbine, Nov 1992, *Brooker* 11330 (BRI, CANB, NSW); 11.7 km SE of Mt Janet, on survey road along the Dividing Range, Sep 1984, *Clarkson* 5508 (BRI, CANB, NSW, QRS); 7.2 km E of the Peninsula Development road on a track to the West Normanby River, Sep 1984, *Clarkson* 5532 (BRI, CANB, DNA, MEL, NSW); 14.7 km N of Lakeland Downs on track to Bob's Hut, Oct 1993, *Clarkson* 10151 & *Neldner* (BRI, CANB, NSW); 2 km S of Mt Carbine on Mareeba road, Nov 1995, *Forster* PIF18126 & *Spokes* (BRI, QRS); Campbell Creek on Curraghmore Holding, Nov 1971, *Hyland* 5694 (BRI, QRS); 16 km S of Lakeland Downs, Nov 1989, *Jobson* 986 & *Lum* (BRI, DNA, CANB, MEL); Mt Carbine, Oct 1976, *Knowlton* 58 (BRI, QRS); 16 miles WNW of Mt Carbine, Jun 1968, *Pedley* 2601 (BRI); near Kelly St George River, c. 58 miles [93 km] NW of Mareeba, Oct 1962, *Smith* 12053 (BRI); Desailly Range, Jun 1971, *Stocker* 745 (BRI, QRS).

Distribution and habitat: *E. tardecidens* has a restricted distribution in northern



Map 1. Distribution of *Eucalyptus provecta* ▲, E. *normantonensis* ●



Map 2. Distribution of *Eucalyptus tardecidens* ▲, *E. persistens* ●

Queensland, extending from Lakeland Downs to south of Mt Carbine (Map 2).

Phenology: Flowers are recorded mainly from October to February.

Affinities: *E. tardecidens* has the largest fruits of the group. It differs from *E. persistens* by its ribbed hypanthium, shorter style, longer and broader fruits and presence of an operculum scar.

Conservation status: Although the geographical extent of this species is small, it is very common within its area of occurrence. No conservation coding is recommended.

Key to the species in the *Eucalyptus normantonensis* group

1. Stamens all fertile 2
   Outer whorl of stamens without anthers 3

2. Outer operculum shed very early; fruits 4.5–5.5×4–4.5 mm ..... **E. tardecidens**
   Outer operculum retained until anthesis; fruits 3–4.5×3–3.5 mm ..... **E. persistens**

3. Mallees; bark rough at base, smooth above; outer filaments 2–3 mm long; petioles 0.6–1.0 cm long ..... **E. normantonensis**
   Trees; bark rough throughout; outer filaments 4.5–5.5 mm long; petioles 1.0–1.7 cm long ..... **E. provecta**

Acknowledgements

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References

Blakely, W.F. (1934). *Sydney: A Key to the Eucalypts*. 1st edition. Sydney: The Worker Trustees.

Chippendale, G.M. (1988). *Myrtaceae - Eucalyptus, Angophora* in *Flora of Australia*, Volume 19. Canberra: Australian Government Publishing Service.

Hall, N. & Brooker, M.I.H. (1974). *Forest Tree Series Leaflet No. 160*. Canberra: Australian Government Publishing Service.

Johnson, L.A.S. & Hill, K.D. (1991). Systematic studies in the eucalypts - 4. New taxa in *Eucalyptus* (Myrtaceae), *Telopea* 4(2): 321–49.

Pryor, L.D. & Johnson, L.A.S. (1971). *A Classification of the Eucalypts*. Canberra: Australian National University.